

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

Public Service Commission of Wisconsin
RECEIVED: 03/01/11, 3:21:44 PM

Public Service Commission of Wisconsin Report on Water Conservation Programs

Utility Name: Waukesha Water Utility
Report Date: Report Due Date – 03/01/2011
Report Period: 01/01/2010– 12/31/2010
Report Frequency: Annual
Billing Frequency: Quarterly
Person Submitting Report: Nancy Quirk, P.E.

Background

The Public Service Commission ordered the Waukesha Water Utility to report to the Commission by March 1 of each year on its water conservation programs in docket 6240-WR-106.

The order reads to provide the following information:

- a. setting forth monthly [quarterly usage will be provided as Waukesha Water Utility does not bill monthly at this time] water usage for each customer class;
- b. the measures taken to educate residential customers about the conservation rate structure and its intended purpose;
- c. the number of single family and multi-family residential customers affected by the conservation rates;
- d. the breakdown of residential usage for single family, duplex, and triplex customers per block per quarter;
- e. an analysis of the effects of the overall water conservation program on customer behavior and water usage trends;
- f. the total number of customers receiving a toilet rebate by customer class and any other information the utility can supply that will explain what programs are producing results and what programs , though well meaning, may be having little or no effect.

PART I – WATER CONSERVATION RATES

Our first inclining rate block structure went into effect in June of 2007. The billing system at that time was not able to separate our residential class from single family to duplex or triplex. The billing system was upgraded to accommodate those rate classes at the time our second inclining rate block structure went into effect in June of 2009.

Residential Rates

RESIDENTIAL RATES PER THOUSAND GALLONS (EFFECTIVE 6/5/09)				
		One Family	Duplex	Triplex
	Amount	Gallons	Gallons	Gallons
Block 1	\$ 2.05	0 - 10,000	0 - 20,000	0 - 20,000
Block 2	\$ 2.65	10,001 - 30,000	20,001 - 35,000	20,001 - 60,000
Block 3	\$ 3.40	Over 30,000	Over 35,000	Over 60,000

RESIDENTIAL RATES PER THOUSAND GALLONS (EFFECTIVE 6/1/07)				
		One Family	Duplex*	Triplex*
	Amount	Gallons	Gallons	Gallons
Block 1	\$ 1.95	0 - 30,000	0 - 30,000	0 - 30,000
Block 2	\$ 2.20	30,001 - 40,000	30,001 - 40,000	30,001 - 40,000
Block 3	\$ 2.70	Over 40,000	Over 40,000	Over 40,000

* The customer billing system did not have the duplex and triplex separated from single family until later in 2007.

Data for the water usage in our residential class of customers over 2008 and 2010 follows:

SINGLE FAMILY RESIDENTIAL

Billing Period 1 - [January 1st – March 31st], [2008-2010] SINGLE FAMILY RESIDENTIAL

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-10,000)	2010	5,452	35.1%	34,459,700	16.6%
	2009	5,316	34.6%	33,421,400	16.0%
	2008	5,088	33.3%	31,566,200	14.9%
Block 2 (10,001-30,000)	2010	9,674	62.2%	156,750,700	75.4%
	2009	9,592	62.4%	156,263,300	74.9%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

	2008	9,707	63.5%	160,089,900	75.6%
Block 3 (30,000+)	2010	419	2.7%	16,602,400	8.0%
	2009	468	3.0%	18,961,600	9.1%
	2008	486	3.2%	19,983,300	9.4%
Total	2010	15,545	100.0%	207,812,800	100.0%
	2009	15,376	100.0%	208,646,300	100.0%
	2008	15,281	100.0%	211,639,400	100.0%

Billing Period 2 - [April 1st – June 30th], [2008-2010] **SINGLE FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-10,000)	2010	5,642	36.3%	35,987,800	17.4%
	2009	5,455	35.4%	34,553,500	16.6%
	2008	5,193	34.0%	32,928,300	15.6%
Block 2 (10,001-30,000)	2010	9,469	60.9%	153,631,700	74.4%
	2009	9,495	61.6%	154,892,300	74.6%
	2008	9,607	62.9%	158,400,600	75.1%
Block 3 (30,000+)	2010	431	2.8%	16,855,700	8.2%
	2009	456	3.0%	18,223,500	8.8%
	2008	482	3.2%	19,465,900	9.2%
Total	2010	15,542	100.0%	206,475,200	100.0%
	2009	15,406	100.0%	207,669,300	100.0%
	2008	15,282	100.0%	210,794,800	100.0%

Billing Period 3 - [July 1st – September 30th], [2008-2010] **SINGLE FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-10,000)	2010	4,899	31.5%	31,028,900	13.4%
	2009	4,175	27.1%	26,545,900	10.3%
	2008	4,204	27.5%	26,717,700	10.6%
Block 2 (10,001-30,000)	2010	9,869	63.4%	166,975,200	71.8%
	2009	9,892	64.2%	173,091,000	67.0%
	2008	9,785	63.9%	170,038,600	67.3%
Block 3 (30,000+)	2010	808	5.2%	34,392,400	14.8%
	2009	1,351	8.8%	58,730,600	22.7%
	2008	1,314	8.6%	56,004,900	22.2%
Total	2010	15,576	100.0%	232,396,500	100.0%
	2009	15,418	100.0%	258,367,500	100.0%
	2008	15,303	100.0%	252,761,200	100.0%

Billing Period 4 - [October 1st – December 31st], [2008-2010] **SINGLE FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-10,000)	2010	5,253	33.7%	33,394,800	15.3%
	2009	5,090	32.9%	32,578,500	14.8%
	2008	4,868	31.7%	30,847,100	13.8%
Block 2 (10,001-30,000)	2010	9,723	62.4%	160,186,400	73.3%
	2009	9,739	63.0%	161,520,500	73.3%
	2008	9,713	63.3%	162,127,100	72.3%
Block 3 (30,000+)	2010	609	3.9%	24,993,100	11.4%
	2009	630	4.1%	26,356,300	12.0%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

	2008	762	5.0%	31,161,000	13.9%
Total	2010	15,585	100.0%	218,574,300	100.0%
	2009	15,459	100.0%	220,455,300	100.0%
	2008	15,343	100.0%	224,135,200	100.0%

Total for Reporting Period [January 1st – December 31st], [2008-2010] **SINGLE FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-10,000)	2010	21,246	34.1%	134,871,200	15.6%
	2009	20,036	32.5%	127,099,300	14.2%
	2008	19,353	31.6%	122,059,300	13.6%
Block 2 (10,001-30,000)	2010	38,735	62.2%	637,544,000	73.7%
	2009	38,718	62.8%	645,767,100	72.1%
	2008	38,812	63.4%	650,656,200	72.3%
Block 3 (30,000+)	2010	2,267	3.6%	92,843,600	10.7%
	2009	2,905	4.7%	122,272,000	13.7%
	2008	3,044	5.0%	126,615,100	14.1%
Total	2010	62,248	100.0%	865,258,800	100.0%
	2009	61,659	100.0%	895,138,400	100.0%
	2008	61,209	100.0%	899,330,600	100.0%

TWO-FAMILY RESIDENTIAL (DUPLEX)

Billing Period 1 - [January 1st – March 31st], [2008-2010] **TWO-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	615	42.4%	8,033,100	22.1%
	2009	613	42.2%	8,135,200	21.5%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

	2008	591	41.4%	7,868,800	21.6%
Block 2 (20,001-35,000)	2010	568	39.1%	14,949,000	41.1%
	2009	548	37.8%	14,558,500	38.4%
	2008	567	39.8%	15,124,000	41.4%
Block 3 (35,000+)	2010	269	18.5%	13,395,500	36.8%
	2009	290	20.0%	15,180,200	40.1%
	2008	268	18.8%	13,497,500	37.0%
Total	2010	1,452	100.0%	36,377,600	100.0%
	2009	1,451	100.0%	37,873,900	100.0%
	2008	1,426	100.0%	36,490,300	100.0%

Billing Period 2 - [April 1st – June 30th], [2008-2010] **TWO-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	635	43.7%	8,272,500	24.1%
	2009	609	42.0%	7,988,700	22.6%
	2008	629	43.3%	8,345,800	23.4%
Block 2 (20,001-35,000)	2010	594	40.9%	15,613,300	45.4%
	2009	578	39.9%	15,206,300	42.9%
	2008	570	39.3%	15,261,300	42.8%
Block 3 (35,000+)	2010	224	15.4%	10,472,800	30.5%
	2009	263	18.1%	12,218,300	34.5%
	2008	253	17.4%	12,028,700	33.8%
Total	2010	1,453	100.0%	34,358,600	100.0%
	2009	1,450	100.0%	35,413,300	100.0%
	2008	1,452	100.0%	35,635,800	100.0%

Billing Period 3 - [July 1st – September 30th], [2008-2010] **TWO-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	585	40.3%	7,565,900	20.5%
	2009	508	35.0%	6,746,800	16.9%
	2008	540	37.0%	7,121,800	18.2%
Block 2 (20,001-35,000)	2010	599	41.2%	15,907,500	43.1%
	2009	593	40.9%	15,879,900	39.8%
	2008	580	39.8%	15,430,200	39.4%
Block 3 (35,000+)	2010	269	18.5%	13,443,700	36.4%
	2009	350	24.1%	17,283,700	43.3%
	2008	338	23.2%	16,642,500	42.5%
Total	2010	1,453	100.0%	36,917,100	100.0%
	2009	1,451	100.0%	39,910,400	100.0%
	2008	1,458	100.0%	39,194,500	100.0%

Billing Period 4 - [October 1st – December 31st], [2008-2010] **TWO-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	596	41.2%	7,915,200	21.7%
	2009	564	38.9%	7,539,500	20.1%
	2008	573	39.3%	7,503,100	19.9%
Block 2 (20,001-35,000)	2010	582	40.2%	15,534,200	42.6%
	2009	596	41.1%	15,945,000	42.4%
	2008	587	40.3%	15,619,300	41.4%
Block 3	2010	269	18.6%	13,058,400	35.8%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

(35,000+)	2009	289	19.9%	14,098,000	37.5%
	2008	298	20.4%	14,581,800	38.7%
Total	2010	1,447	100.0%	36,507,800	100.0%
	2009	1,449	100.0%	37,582,500	100.0%
	2008	1,458	100.0%	37,704,200	100.0%

Total for Reporting Period [January 1st – December 31st], [2008-2010] **TWO-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	2,431	41.9%	31,786,700	22.0%
	2009	2,294	39.5%	30,410,200	20.2%
	2008	2,333	40.3%	30,839,500	20.7%
Block 2 (20,001-35,000)	2010	2,343	40.4%	62,004,000	43.0%
	2009	2,315	39.9%	61,589,700	40.8%
	2008	2,304	39.8%	61,434,800	41.2%
Block 3 (35,000+)	2010	1,031	17.8%	50,370,400	34.9%
	2009	1,192	20.5%	58,780,200	39.0%
	2008	1,157	20.0%	56,750,500	38.1%
Total	2010	5,805	100.0%	144,161,100	100.0%
	2009	5,801	100.0%	150,780,100	100.0%
	2008	5,794	100.0%	149,024,800	100.0%

THREE-FAMILY RESIDENTIAL (TRIPLEX)

Billing Period 1 - [January 1st – March 31st], [2008-2010] **THREE-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	26	31.7%	313,800	13.6%
	2009	27	33.3%	320,300	14.7%
	2008	31	38.8%	392,600	17.6%

Waukesha Water Utility Conservation Report

Docket 6240-WR-106

March 1, 2011

Block 2 (20,001-60,000)	2010	53	64.6%	1,762,100	76.3%
	2009	53	65.4%	1,796,700	82.2%
	2008	46	57.5%	1,559,800	69.9%
Block 3 (60,000+)	2010	3	3.7%	234,100	10.1%
	2009	1	1.2%	69,100	3.2%
	2008	3	3.8%	279,600	12.5%
Total	2010	82	100.0%	2,310,000	100.0%
	2009	81	100.0%	2,186,100	100.0%
	2008	80	100.0%	2,232,000	100.0%

Billing Period 2 - [April 1st – June 30th], [2008-2010] **THREE-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	30	37.0%	375,000	16.6%
	2009	26	32.1%	322,200	14.0%
	2008	28	35.0%	358,100	15.7%
Block 2 (20,001-60,000)	2010	46	56.8%	1,504,300	66.5%
	2009	51	63.0%	1,692,400	73.6%
	2008	48	60.0%	1,627,600	71.4%
Block 3 (60,000+)	2010	5	6.2%	384,400	17.0%
	2009	4	4.9%	283,500	12.3%
	2008	4	5.0%	293,000	12.9%
Total	2010	81	100.0%	2,263,700	100.0%
	2009	81	100.0%	2,298,100	100.0%
	2008	80	100.0%	2,278,700	100.0%

Billing Period 3 - [July 1st – September 30th], [2008-2010] **THREE-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	32	38.6%	351,100	15.6%
	2009	22	27.2%	286,300	11.4%
	2008	21	25.9%	256,600	11.0%
Block 2 (20,001-60,000)	2010	48	57.8%	1,689,100	74.9%
	2009	54	66.7%	1,857,200	74.2%
	2008	58	71.6%	1,904,900	82.0%
Block 3 (60,000+)	2010	3	3.6%	214,000	9.5%
	2009	5	6.2%	359,900	14.4%
	2008	2	2.5%	162,100	7.0%
Total	2010	83	100.0%	2,254,200	100.0%
	2009	81	100.0%	2,503,400	100.0%
	2008	81	100.0%	2,323,600	100.0%

Total for Reporting Period [January 1st – December 31st], [2008-2010] **THREE-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	28	35.0%	306,900	13.1%
	2009	21	25.9%	268,900	11.5%
	2008	28	34.6%	351,200	15.9%
Block 2 (20,001-60,000)	2010	47	58.8%	1,668,700	71.0%
	2009	57	70.4%	1,858,600	79.8%
	2008	52	64.2%	1,779,100	80.5%
Block 3 (60,000+)	2010	5	6.3%	373,300	15.9%
	2009	3	3.7%	201,600	8.7%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

	2008	1	1.2%	79,400	3.6%
Total	2010	80	100.0%	2,348,900	100.0%
	2009	81	100.0%	2,329,100	100.0%
	2008	81	100.0%	2,209,700	100.0%

Total for Reporting Period [01/01/2008 - 12/31/2008], [01/01/2010 - 12/31/2010] **THREE-FAMILY RESIDENTIAL**

Volume Block (Gallons)	Year	Number of Customers with Bills Ending in Block	Percentage of Customers with Bills Ending in Block	Total Volume Billed in Block in Period	Percentage of Volume Billed in Block in Period
Block 1 (0-20,000)	2010	116	35.6%	1,346,800	14.7%
	2009	96	29.6%	1,197,700	12.9%
	2008	108	33.5%	1,358,500	15.0%
Block 2 (20,001-60,000)	2010	194	59.5%	6,624,200	72.2%
	2009	215	66.4%	7,204,900	77.3%
	2008	204	63.4%	6,871,400	76.0%
Block 3 (60,000+)	2010	16	4.9%	1,205,800	13.1%
	2009	13	4.0%	914,100	9.8%
	2008	10	3.1%	814,100	9.0%
Total	2010	326	100.0%	9,176,800	100.0%
	2009	324	100.0%	9,316,700	100.0%
	2008	322	100.0%	9,044,000	100.0%

Non-Residential Rates

Non-residential customers were under the same ordinance to ban sprinkling in daytime hours. The 2009 rate case also increased the amount of the rate between rate blocks

Usage Fees per 1,000 Gallons		
Gallons	Commercial, Industrial, Public (2007-2008 Rates)	Commercial, Industrial, Public (June 2009 Rates)
0 - 75,000	\$1.95	\$2.33
75,001 - 1,500,000	\$1.83	\$2.19
Over 1,500,000	\$1.61	\$1.96

Metered Usage for Non-Residential in 2008 and 2009					
Billing Class	2008 (Gallons)	2009 (Gallons)	2010 (Gallons)	% Change from 2010 to 2009	% Change from 2010 to 2008
Commercial	827,543,000	806,736,000	801,713,900	-0.62%	-3.12%
Industrial	382,413,000	325,667,000	326,289,200	+ .19%	-14.68%
Public	99,646,000	99,619,000	93,491,300	-6.15%	-6.18%

Outdoor Water Use/Irrigation Rates

The City wide ordinance 13.11 was enacted in 2006 and applied to all homes and businesses in Waukesha and is applicable May 1 to Oct 1 each year. This ordinance bans all sprinkling during the daytime hours of 9 AM to 5:00 PM during the stated time period. Customers are allowed to irrigate two days a week according to their address. Previous studies in the United States had indicated that we could expect a 40% reduction between average day and peak day with a two a week sprinkling allowance. Fines are approved and in place for violations to this ordinance.

Year	Volume Of Water Pumped From May 1 To September 30	% Change In Volume Pumped From 2005 (Pre- Sprinkling Ordinance)	Average Day Demand In (MG*)	Peak Day Demand In (MG*)	Difference In Average Day To Peak Day (MG*)	% Reduction In Peak Day To Average Day Demand From 2005
2010	1074691000	-19.40	6.69	8.65	1.96	61.1%
2009	1109337000	-16.80	6.79	9.35	2.56	49.7%
2008	1128313000	-15.38	6.91	9.93	3.02	40.7%
2007	1184112000	-11.19	7.17	9.79	2.62	48.5%
2006	1175796000	-11.82	7.18	10.23	3.05	40.1%
2005	1333367000	N/A	7.78	12.87	5.09	N/A

*Million Gallons

Notice to customers for Sprinkling Ordinance:

2006-Special Mailing of sprinkling brochure to each customer

2007-Bill Stuffer of sprinkling brochure to each customer

2008-Refrigerator Magnet inserted as a bill stuffer to each customer

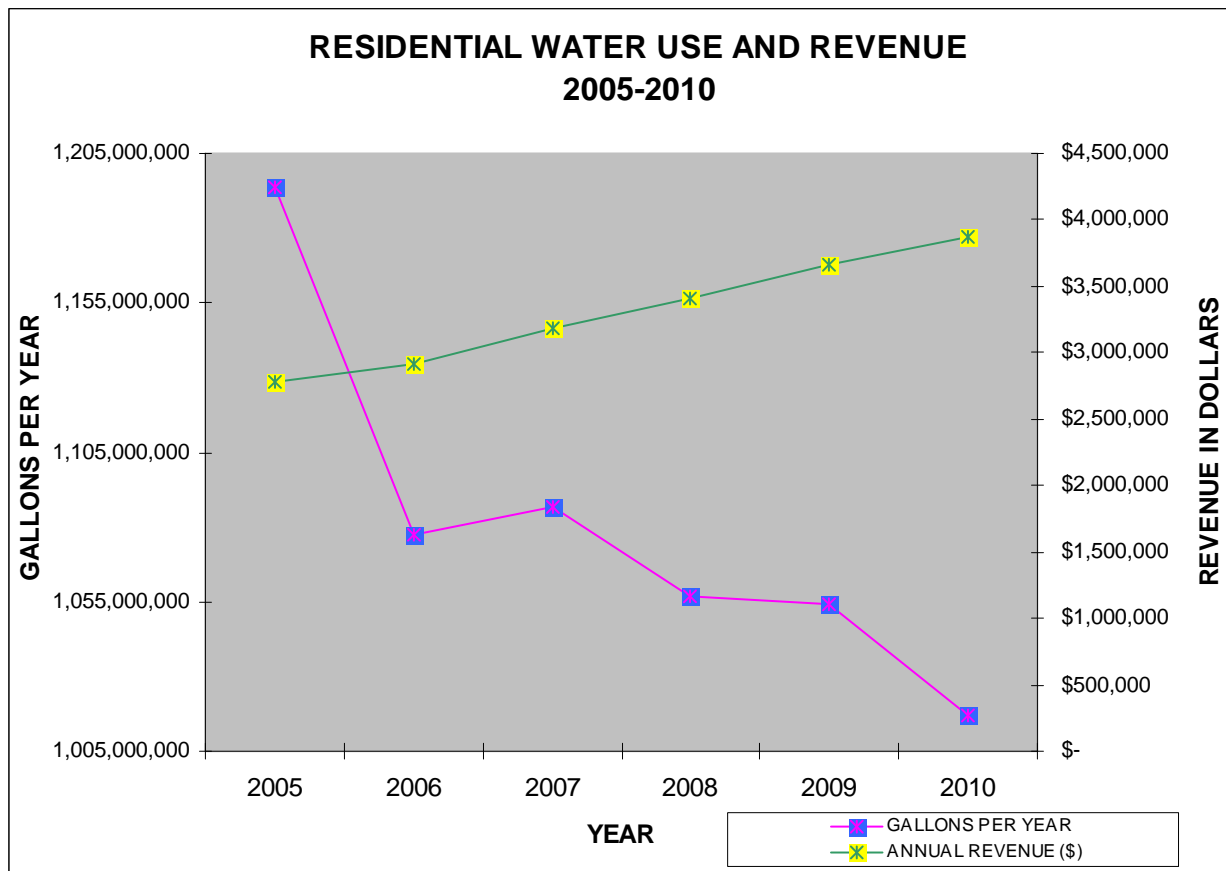
2009-Postcard as a bill stuffer to each customer

2010-Postcard as a bill stuffer and yard signs for a "Brown Lawn" Campaign

2006-2010-Message on Water Bill under "IMPORTANT INFORMATION" from April to October reads:
"The Sprinkling Ordinance is in effect May-Oct 1st. Odd number addresses water on Tuesday and Saturday; even number address on Thursdays and Sundays, before 9am and after 5pm."

Revenues

CHART 1: RESIDENTIAL WATER USE AND REVENUE 2005-2010



NOTE: "Residential" in the chart above includes single family, duplex and triplex customers.

Customer Education

Which of the following measures were used to inform your customers about your utility's conservation efforts and the purpose for the conservation rate structure? *[Choose all that apply.]*

- ☒ Website
- ☒ Bill Stuffers
- ☒ Local Newspaper
- ☒ TV/Radio Advertising
- ☐ Billboards
- ☒ Postings at Utility Offices
- ☒ Public Meetings
- ☒ School Programs
- ☒ Other Street Signs
- ☒ Other Brown Lawn Campaign



PART II – REBATES, INCENTIVES, AND CONSERVATION EXPENSES

Conservation Program Budget and Expenses

Conservation Program Account Balance Sheet/Expenses for Period [01/01/2008- 12/31/2010]

Item	Year (2008)	Year (2009)	Current Reporting Year (2010)
Beginning Balance (Budgeted Amount)	\$31,193.00	\$45,061.00	\$48,626.00
Amount Escrowed (Collected)	Not required in our rate case	Not required in our rate case	Not required in our rate case
Expenditures			
Toilet Rebates	\$475.00	\$700.00	\$400.00
Administrative Costs (Include salary, overhead, postage, verification, etc.)	\$16,138.14	\$22,651.02	\$25,407.22
Direct Advertising Costs (Include radio, television, bill stuffers, other advertising and marketing costs)	\$4,572.55	\$3,093.18	\$2821.17
Other Program Costs (For example, low flow shower heads, water audits, etc.)	\$200.00 (Alliance for Water Efficiency Dues)	\$200.00 (Alliance for Water Efficiency Dues)	\$474.59
Total Expenditures	\$21,385.69	\$26,644.20 (*)	\$29,102.98
End of Year Balance (or Deferred Expenses)	\$9,807.31	\$18,416.80	\$19,523.02

(*) The 2009 Rate case was planned to be in effect in April of 2009. Due to the intervention of Clean Wisconsin in our rate case, and subsequent delay of the increased rates, expected income for the year was reduced by over \$200,000. Drastic operational and capital budget cuts needed to be made to compensate for the loss of income and unexpected court costs that we incurred as a result of the intervention. These budget cuts affected our conservation program expenses.

Rebate and Incentive Programs

On October 18, 2008, Waukesha Water Utility offered a Toilet Rebate Program. The program offers a \$25.00 rebate for Waukesha Water Utility customers who replaced their high-volume toilets with a High-Efficiency WaterSense 1.28 gallon per flush toilet. Rebates are limited to one per service address.

Since October 18, 2008, Waukesha Water Utility has had 65 customers benefit from this program.

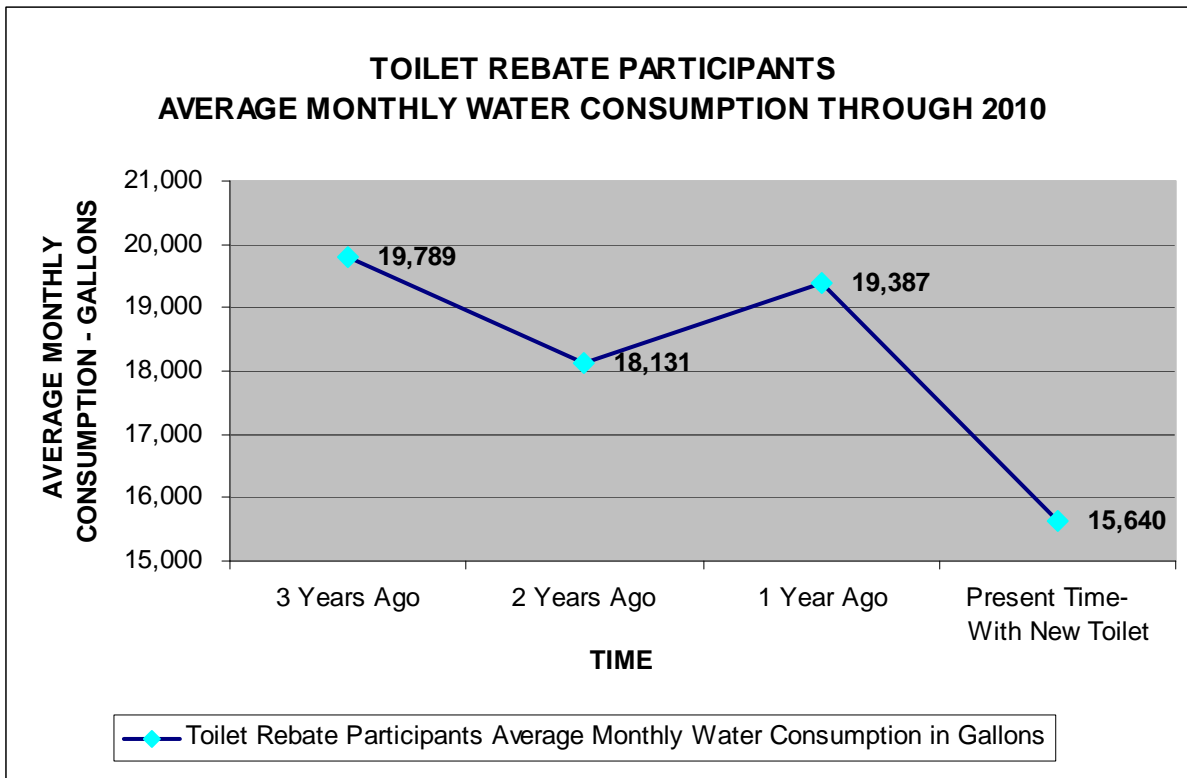
Waukesha Water Utility's Customer Eligibility for the Rebate

Qualifications to receive a toilet rebate:

1. Property where toilet is installed is a customer of Waukesha Water Utility.
2. High Efficiency Toilets must replace toilets installed prior to 1994. (If you are unsure of the vintage of your toilet, you can often check the date of manufacture by looking at the underside of the tank lid. The date of the manufacture is often stamped into the porcelain. If your toilet was made after 1994, it should be an efficient model. Toilets made during the 1980s typically were designed to use 3.5 gallons per flush. Older toilets often use much more water.)
3. New toilet must be listed on EPA's WaterSense Toilet model list.
4. Applicant must be the owner of the property listed on the rebate application.
5. An original, unaltered, dated sales receipt (dated on or after Oct. 18) listing the make and model numbers, MUST accompany the rebate application.
6. Old toilets cannot be reused.
7. A picture showing proof of installation is required to be attached to the application in order to receive the rebate.
8. Applicant agrees and understands that Waukesha Water Utility or its representatives reserve the right to inspect the installation of the fixture before or after the rebate credit is mailed out to the applicant.
9. Applicant understands that Waukesha Water Utility may withhold rebate until any or all of the above listed conditions are met.

This program has been very effective. As a group, the customers have saved 1,476,975 gallons of water. Following is a summary showing this program's effectiveness:

TOILET REBATE TABLES AND CHARTS



NUMBER OF TOILET REBATES BY MONTH	
MONTH	NUMBER OF TOILET REBATES APPLIED FOR
October 2008	9
November 2008	9
January 2009	2
February 2009	2
March 2009	2
April 2009	2
May 2009	1
June 2009	7
July 2009	4
August 2009	1
September 2009	5
October 2009	3
November 2009	1
January 2010	1
February 2010	3
March 2010	3
April 2010	1
May 2010	6
June 2010	2
December 2010	1
Total to Date	65

Waukesha Water Utility Conservation Report

Docket 6240-WR-106

March 1, 2011

Toilet Rebate Customer Usage Analysis - Prepared 2/28/11								
	Account Number	High Efficiency Toilet Install Date	Total No. of Quarters with the High Efficiency Toilet	Average Consumption Per Quarter 2 Years Before New Toilet Installed	Average Consumption Per Quarter 1 Year Before New Toilet Installed	*Avg Consumption Per Quarter w/New Toilet	**Total Gallons of Water Saved With New Toilet	Avg % Per Qtr Water Savings
1	114683000	10/15/2008	8	13,300	13,400	10,988	18,900	17.70%
2	103256000	10/18/2008	9	17,950	16,450	11,589	50,500	32.62%
3	318188000	10/18/2008	9	9,050	6,550	5,600	19,800	28.21%
4	118428000	10/19/2008	8	17,100	17,100	16,513	4,700	3.44%
5	120690000	10/19/2008	9	8,625	5,400	8,511	-13,488	-21.37%
6	319638000	10/19/2008	9	30,900	25,675	21,189	63,888	25.09%
7	130184200	10/20/2008	8	7,925	7,600	7,238	4,200	6.76%
8	121908000	10/23/2008	8	12,025	11,925	11,063	7,300	7.62%
9	217245000	10/24/2008	9	9,450	10,700	9,156	8,275	9.13%
10	321800000	11/1/2008	9	18,400	17,625	14,622	30,513	18.82%
11	117046000	11/2/2008	8	30,875	30,225	6,600	191,600	78.40%
12	218904000	11/8/2008	9	16,275	12,925	11,733	25,800	19.63%
13	101170000	11/10/2008	8	0	1,600	3,138	-12,300	-96.09%
14	124381000	11/14/2008	9	16,925	16,850	14,656	20,088	13.22%
15	306059000	11/20/2008	9	12,700	14,200	10,078	30,350	25.07%
16	122893000	11/22/2008	8	28,925	28,175	22,300	50,000	21.89%
17	319613000	11/23/2008	9	27,950	28,550	26,900	12,150	4.78%
18	319642000	11/24/2008	9	41,175	39,525	40,956	-5,450	-1.50%
19	111163000	1/20/2009	7	5,525	6,175	8,714	-20,050	-48.96%
20	115115000	1/30/2009	7	20,550	17,675	15,714	23,788	17.78%
21	309059000	2/16/2009	8	15,275	14,700	11,063	31,400	26.19%
22	207109000	2/21/2009	8	23,175	20,025	16,413	41,500	24.02%
23	321751000	3/18/2009	8	9,275	10,025	8,125	12,200	15.80%
24	108052000	3/27/2009	7	19,875	23,625	19,186	17,950	11.79%
25	225025000	4/17/2009	6	19,925	19,175	15,933	21,700	18.50%
26	123918000	4/22/2009	7	24,425	22,550	19,314	29,213	17.77%
27	321197000	5/15/2009	7	55,050	49,525	38,614	95,713	26.15%
28	311042000	6/4/2009	7	21,400	23,600	18,814	25,800	16.38%
29	311042000	6/4/2009	7	21,400	23,600	18,814	25,800	16.38%
30	101257000	6/10/2009	6	4,550	5,725	4,550	3,525	11.44%
31	201228000	6/16/2009	6	17,250	18,100	8,283	56,350	53.14%
32	322186000	6/19/2009	7	18,725	17,750	14,557	25,763	20.18%
33	324177000	6/22/2009	6	11,750	11,725	9,933	10,825	15.37%
34	307031000	6/25/2009	7	0	79,600	50,971	200,400	35.97%
35	115510000	7/3/2009	6	12,725	11,925	11,500	4,950	6.69%
36	319303000	7/8/2009	6	33,325	33,775	31,050	15,000	7.45%
37	214477000	7/14/2009	5	14,375	14,675	10,380	20,725	28.54%
38	116605000	7/17/2009	5	17,725	16,000	10,720	30,713	36.43%
39	323065000	8/30/2009	6	15,275	15,525	11,617	22,700	24.57%
40	118721000	9/1/2009	5	15,400	16,000	14,660	5,200	6.62%
41	112616000	9/7/2009	5	28,275	29,200	30,980	-11,213	-7.80%
42	115835000	9/12/2009	6	19,267	17,450	15,517	17,050	15.48%

Waukesha Water Utility Conservation Report

Docket 6240-WR-106

March 1, 2011

43	113490000	9/20/2009	5	10,625	12,225	9,300	10,625	18.60%
44	108002000	9/30/2009	5	36,450	39,075	27,460	51,513	27.28%
45	117200000	10/2/2009	4	8,775	9,400	5,950	12,550	34.53%
46	217250000	10/20/2009	5	16,575	16,125	14,080	11,350	13.88%
47	222283000	10/30/2009	4	7,500	9,225	6,300	8,250	24.66%
48	224013000	11/13/2009	4	5,050	5,025	3,900	4,550	22.58%
49	312002000	1/18/2010	4	12,750	16,900	13,800	4,100	6.91%
50	122092000	2/10/2010	3	23,925	20,750	16,000	19,,013	28.37%
51	121953000	2/23/2010	3	17,800	17,650	13,233	13,475	25.34%
52	102771000	2/27/2010	3	20,175	23,300	18,267	10,413	15.97%
53	116624100	3/1/2010	3	16,700	17,150	13,700	9,675	19.05%
54	123900000	3/11/2010	3	15,525	18,100	11,267	16,638	32.99%
55	114586000	3/19/2010	3	14,400	16,300	14,333	3,050	6.62%
56	205487000	4/20/2010	2	12,075	14,125	10,050	6,100	23.28%
57	320005000	5/5/2010	3	18,425	24,650	15,200	19,013	29.43%
58	120458000	5/6/2010	3	20,725	15,150	21,867	-11,788	-21.90%
59	218850000	5/10/2010	2	28,300	27,125	17,850	19,725	35.59%
60	218850000	5/10/2010	2	28,300	27,125	17,850	19,725	35.59%
61	216060000	5/14/2010	3	28,225	32,600	24,167	18,738	20.54%
62	123965000	5/20/2010	2	9,325	10,700	8,300	3,425	17.10%
63	322067000	6/21/2010	3	24,775	24,150	26,200	-5,213	-7.10%
64	321727000	6/26/2010	3	19,925	21,325	23,633	-9,025	-14.59%
65	319413000	12/10/2010	0	24825	21700	Recently Installed	NA	NA
Sub-Totals:				1,160,392	1,240,775	1,000,956		
Averages:				18,131	19,387	15,640		
Total Gallons Water Saved:							1,430,825	
Average Saved/Customer:							22,357	15.37%

NOTES:

*Total Consumption with New Toilet divided by number of Quarters with New Toilet

**Gallons Saved per Quarter * Total Number of Quarters

Other Water Conservation Measures

We continue to utilize and implement our Water Conservation and Protection Plan that was adopted in 2006.

<http://www.ci.waukesha.wi.us/web/guest/waterconservationandprotectionplan>

The City of Waukesha in partnership with Waukesha County created the Wisconsin Water Conservation Coalition in 2006. Past PSC reports have outlined the mission of this coalition and can also be found at our website: <http://www.wisconsinwaterwise.org/>

During 2008, the Waukesha County Coalition ran a residential water contest for City of Waukesha Water Utility customers.

In 2009 the Utility participated in Waukesha Environmental Action League's March conference to present the prizes to the top winners of the contest. The Utility, along with one of the contest winners were interviewed on Wisconsin Public Radio on March 17, 2009. Local Milwaukee TV 6 morning program with Gus Gnorski filmed a morning event at the Water Utility on March 17. There were 3 segments where the utility highlighted components of its conservation program:

1. The Mayor affirmed the City's commitment to water conservation.
2. Kohler, inc. demonstrated low flow toilets and talk about our toilet rebate program
3. The County and City talked about the rain barrel programs they have available and our ordinance.

Throughout 2010 Waukesha Water Utility continued to participate in the coalition's committee work:

- Executive Board
- Business and Industry
- Regional Water Utility Cooperation
- Residential
- Education

In 2010, the Coalition held a Water and Energy Event at the Waukesha County Fairgrounds on May 7 and May 8. May 7 was geared for the business and utility energy and water efficiency. May 8 concentrated on residential water and energy conservation that included a "kid's zone" to help inspire and educate the youth in our larger community on conservation.

Also in 2010, the utility partnered with the coalition to begin water audits of commercial/industrial clients. We also attended the Wisconsin Restaurant Association show and exhibited for water conservation initiatives for restaurants.

The Waukesha Water Utility continues its alliance with Waukesha School District. A utility employee conducts educational sessions in collaboration with their environmental education department with fifth graders. Each year we see close to 1000 students at one of our well houses where we show the students where our water comes from and why and how important it is to use our resource conservatively and efficiently.

PART III – OTHER INFORMATION

Water Sales Trends

Total Water Sales for Period [01/01/2006 - 12/31/2010]

Customer Class	2006	2007	2008	2009	2010	Percentage Change from 2010 to 2006
Residential	\$2,914,420	\$3,261,271	\$3,392,265	\$3,662,593	\$3,868,993	+32.8%
Commercial	\$1,613,037	\$1,804,015	\$1,894,367	\$2,017,141	\$2,193,943	+36.0%
Industrial	\$568,824	\$653,862	\$684,969	\$656,031	\$720,045	+26.6%
Public Authority	\$188,058	\$212,884	\$215,964	\$234,033	\$244,700	+30.1%
Total Sales	\$5,284,339	\$5,932,032	\$6,187,565	\$6,569,797	\$7,027,681	+33.0%

Waukesha Water Utility Conservation Report
Docket 6240-WR-106
March 1, 2011

Average Number of Customers for Period [01/01/2006 - 12/31/2010]

Customer Class	2006	2007	2008	2009	2010	Percentage Change from 2010 to 2006
Residential	16,501	16,677	16,827	16,955	17,126	+3.79%
Commercial	2,235	2,264	2,276	2,264	2,171	-2.86%
Industrial	144	141	144	147	147	+2.08%
Public Authority	123	116	116	117	118	-4.07%
Total Customers	19,003	19,198	21,523	19,483	19,562	+2.94%

Total Water Volumes Billed for Period [01/01/2006 - 12/31/2009]

Customer Class	2006	2007	2008	2009	2010	Percentage Change 2010 to 2006
Residential	1077127000	1086542000	1056650000	1054288000	1016670300	-5.95%
Commercial	858062000	846566000	827543000	806736000	801713900	-7.03%
Industrial	424603000	404079000	382413000	325667000	326289200	-30.13%
Public Authority	109846000	110532000	99646000	99619000	93491300	-17.49%
Total Volume of Sales	2469638000	2447719000	2366252000	2286310000	2238164700	-10.34%

Water Loss and Unaccounted For Water

Waukesha Water Utility had 30 main breaks in 2010. Waukesha Water Utility had 34 main breaks in 2009. We had only 29 breaks in 2008. Please refer to “**Attachment A**” for further discussion of pressure management and water loss at Waukesha Water Utility.

Year	Total Sales (Thousands of Gallons)	Unaccounted for Water (Thousands of Gallons)	Unsold Accounted for Water (Thousands of Gallons)	Total Water Pumped (Thousands of Gallons)	% Un- accounted for water
2010	2,238,164	156,578	43,222	2,437,964	7
2009	2,286,310	165,655	27,930	2,479,895	7
2008	2,366,252	126,833	37,879	2,528,933	4
2007	2,447,719	167,172	3,791	2,618,641	6
2006	2,469,638	136,136	14,676	2,622,418	5
2005	2,616,913	209,543	5,054	2,838,403	7
2004	2,528,554	164,257	6,169	2,699,006	6
2003	2,653,921	138,710	3,228	2,795,858	5
2002	2,831,912	99,764	21,540	2,953,217	3
2001	2,703,549	80,511	37,909	2,821,969	3
2000	2,685,085	131,630	19,426	2,836,141	5
1999	2,859,918	144,912	23,584	3,028,414	5

Additional Information

There are varying factors that influence water usage in a community. It is very difficult to determine the exactness of the effectiveness of a conservation program. We keep records of rainfall, temperatures, economic conditions, and development trends as indicators of our water use patterns. We share data with neighboring utilities to negate some of the variability and unknowns as regard to weather. Below you will see the records for Waukesha Water Utility, City of Brookfield Water, City of Oconomowoc and the City of Pewaukee. We can see from this data comparison that our major difference in water usage is in summer pumping. We have effectively reduced our peak demands and thereby lowering the water use from the months of May 1 to October 1.

We can also conclude from the data below that due to our extensive public relations efforts, there are regional benefits as well.

Waukesha Pumpage		
	Total for Year	May 1 to Oct 1
2005	2838403020	1333367000
2006	2623418000	1175795000
2007	2618461000	1183827000
2008	2531108000	1128313000
2009	2479905000	1109337000
2010	2441221000	1074691000
2010 to 2009	-1.56%	-3.12%
2010 to 2005	-13.99%	-19.40%
Brookfield Pumpage		
	Total for Year	May 1 to Oct 1
2005	1496931000	737230000
2006	1465878000	738889000
2007	1368726000	669849000
2008	1446256000	638479000
2009	1295283000	653848000
2010	1272681000	607443000
2010 to 2009	-1.74%	-7.10%
2010 to 2005	-14.98%	-17.60%
Oconomowoc Pumpage		
	Total for Year	May 1 to Oct 1
2005	708458000	370121000
2006	673143000	337035000
2007	686683000	355702000
2008	677227000	337653000
2009	676528000	344909000
2010	719994000	342468000
2010 to 2009	6.42%	-0.71%
2010 to 2005	14.75%	-7.47%
Pewaukee Pumpage		
	Total for Year	May 1 to Oct 1
2005	500991000	279850000
2006	479448089	262316861
2007	445630136	232840449
2008	473648006	245615011
2009	442530424	247172062
2010	441759831	219440293
2010 to 2009	-0.17%	-11.22%
2010 to 2005	-11.82%	-21.59%

Summary/Conclusions

3/1/11

Note: Sprinkling Ordinance went into effect in 2006

Note: Inclining Rate Block Structure went into effect in June 2007

Note: 2nd Inclining Rate Block Structure went into effect in June 2009

Year	Total Pumped in Year	# Days <= 7.8 MGD	# Days > 7.8 MGD and <=8.8 MGD	# Days >8.8 MG and <=9 MG	# Days > 9 MG and <=10 MG	# Days >10 MG and <=11 MG	# Days>11 MG and <=12 MG	# Days >12 MG and <=13 MG	# Days > 13 MG	Avg. Day Pumping (gal)
2010	2441221000	342	23	0	0	0	0	0	0	6688277
2009	2479905000	330	32	2	1	0	0	0	0	6794260
2008	2528933000	328	30	6	2	0	0	0	0	6909653
*2007	2618641000	292	51	8	14	0	0	0	0	7174359
2006	2622418000	294	61	1	8	1	0	0	0	7184707
2005	2838403020	225	78	6	28	18	7	3	0	7776447
2004	2699005482	276	59	6	20	5	0	0	0	7374332
2003	2699005482	250	67	3	22	18	5	0	0	7659885
2002	2953216710	176	119	10	28	17	14	1	0	8091005
2001	2821968452	217	103	8	16	15	2	4	0	7731420
2000	2836140994	190	139	15	21	1	0	0	0	7749019
1999	3028415000	116	145	23	57	21	3	0	0	8297027
1998	3028415000	156	123	14	49	16	5	2	0	8149064

From the data above, you can see the effect of the implementation of the various programs in our conservation plan over time:

- Our total water pumped has steadily declined
- Our average day pumping has steadily declined
- The days where we needed to pump higher volumes of water have decreased.



AECOM
200 Indiana Avenue
Stevens Point, WI 54481
www.aecom.com

715 341 8110 tel
715 341 7390 fax

Final Memorandum

To	Nancy Quirk, Waukesha Water Utility
CC	Kathy Beduhn, AECOM
Subject	Distribution Water System Pressure Waukesha Water Utility
From	Richard Hope, AECOM
Date	February 25, 2011

1.0 INTRODUCTION

The City of Waukesha has submitted an application to the Wisconsin Department of Natural Resources (DNR) for the diversion of Lake Michigan water. The DNR has requested additional information on and clarification of the application. Specifically, Wisconsin Administrative Code NR 852 (Table 2) requires the review of distribution system pressure management to determine if opportunities exist to reduce water system pressure and minimize water loss, and the DNR has requested clarification of whether Waukesha Water Utility is operating the water system within acceptable water system pressures, especially with respect to minimizing water loss. This memorandum responds to that specific request for clarification.

The Wisconsin Administrative Code NR 852 requiring the review of the distribution system pressure management is documented below.

Table 2. Required Conservation and Efficiency Measures
Wisconsin Administrative Code NR 852

CEM #	Description	Required Elements
Public Water Supply Water Use Sector (PWS)		
PWS-R1	Distribution System Pressure Management	Analyze distribution system pressure management to identify opportunities to reduce water use and minimize plumbing fixture leaks.

AECOM prepared the Water System Master Plan (August 2006) for the Waukesha Water Utility. As part of the Water System Master Plan a calibrated hydraulic model was developed and used to assist in the evaluation of system capacity and water system pressure throughout the water system. AECOM has the experience in the evaluation of water systems and specific knowledge of the Waukesha water system to provide an opinion on the whether the water system is being operated within acceptable water system pressures.

2.0 WATER SYSTEM PRESSURE

A water system needs to be designed so that adequate water system pressure is available to meet customers' needs and to provide required fire flows. In addition, regulatory requirements specify minimum pressure requirements because of health concerns that can result from the ingress of water into the water mains.

Wisconsin Administrative Code Clause 811.70 (4) discusses system pressure:

(4) **PRESSURE.** All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The minimum and maximum normal static pressure in the distribution system shall be 35 psi and 100 psi, respectively, at ground level. The system shall be designed and operated to maintain a minimum residual pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow.

Further guidelines are provided in the Ten State Standard:

8.2 SYSTEM DESIGN

8.2.1 Pressure

All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis (is completed) based on flow demands and pressure requirements. The system shall be designed to maintain a minimum pressure of 20 psi (140 kPa) at ground level at all points in the distribution system under all conditions of flow. The normal working pressure in the distribution system should be approximately 60 to 80 psi (410 - 550 kPa) and not less than 35 psi (240 kPa).

3.0 WAUKESHA WATER SYSTEM

Water system pressure varies throughout a distribution system due to topography and water demands. The service area for the Waukesha Water Utility has a varied topography (with elevations ranging from approximately 780 feet to 1,050 feet). To accommodate this topography change, the Waukesha Water Utility water distribution system is divided into eight pressure zones. Each pressure zone was developed to maintain system pressure within regulatory requirements.

As part of the Water System Master Plan, a detailed evaluation of the water system pressure in each pressure zone was performed. To assist in the evaluation of water system pressures and available fire flow, a detailed hydraulic model of the Waukesha water system was developed. The model allowed system pressures and fire flows to be evaluated under a range of existing and future water demand and operating conditions.

The evaluation confirmed that water system pressures were adequate to meet customer needs and fire flow requirements. One of the recommendations resulting from the evaluation was to readjust some of the pressure zone boundaries to better serve residents. The Waukesha Water Utility has implemented the recommended pressure zone boundary realignments; that realignment has improved system pressure, and from a hydraulic perspective the water system pressures are optimized.

4.0 BENEFITS OF LOWER SYSTEM PRESSURES

The previous section discussed the hydraulic reasons for the current water system pressures to ensure adequate flow to customers and the required fire flows. However, operating a water system at a lower water system pressure can have the following benefits:

1. Reduction in the number of water main failures (breaks/leaks)
2. Reduction in loss of water at leaks

These benefits and their impact on the Waukesha water system are addressed in greater detail in the following sections.

4.1. Reduction in Water Main Failures

Water mains are designed to withstand a specific pressure in excess of the pressure the pipe will experience. As with most assets, as the water main ages, its condition deteriorates, and the water main will eventually fail. Water utilities are continually replacing/rehabilitating water mains to minimize water main failures. Table 1 provides details of the number of water breaks that the Waukesha Water Utility has repaired since 2005. To benchmark this with industry guidelines, the failure rate has been converted to number of breaks per 100 miles, based on the 330 miles of water main that comprise the Waukesha water system.

Table 1. Water Main Breaks

Year	Total Number of Water Main Breaks	Water Main Breaks/100 miles of Water Mains
2005	23	7.0
2006	10	3.0
2007	21	6.4
2008	31	9.4
2009	32	9.7
2010	30	9.1

Many factors besides water main pressure—such as pipe material and corrosion—affect water main failure rate, so it is not possible to provide a standard for the allowable number of water main breaks per 100 miles. However, research from the Water Research Foundation provides the data in Table 2 regarding criteria for water main breaks/leaks.

Table 2. Criteria for Water Main Breaks/Leaks

Reference	Criteria
<i>Distribution System Performance Evaluation</i> American Water Works Association (AWWA) Research Foundation, 1995	Typical goal: 25-30 breaks and leaks per 100 miles
<i>Benchmarking Performance Indicators for Water and Wastewater Utilities: 2007 Annual Survey Data and Analysis Report</i> , AWWA, 2007	Top quartile performance range: 14.9–21.7 breaks and leaks per 100 miles
<i>Water Audits and Loss Control Programs</i> , AWWA M36, 2009	Performance goals: no more than 15 reported breaks and leaks per 100 miles

Therefore, the Waukesha Water Utility is well below the criteria presented in Table 2 and it does not appear that water system pressure is a major contributor to water main failure.

4.2 Reduction in Loss of Water at Leaks

The volume of water that is lost from a leak depends on water system pressure. The higher the system pressure, the greater the volume of water that will be lost through the leak; therefore, reducing system pressure reduces the volume of water lost. However, it is important to note that reducing pressure does not eliminate existing leaks.

Typically water loss, or unaccounted-for water (UFW), is specified as a percentage of water supplied, and that is how water loss is reported to the Public Service Commission (PSC) in Waukesha's annual reports. Table 3 provides a summary of UFW from 2005 to 2009.

Table 3. Unaccounted-for Water

Year	Percentage of UFW
2005	7
2006	5
2007	6
2008	4
2009	7

The PSC requires the utility to take action to reduce UFW when it reaches 15 percent. The Waukesha Water Utility is below the action level of 15 percent, and pressure does not appear to be major contributor to water loss.

AWWA (Water Audits and Loss Control Programs – M36) recommends an approach that looks at the volume of water lost and uses an Infrastructure Leakage Index (ILI) as a benchmark to compare how well a utility is managing leakage. The lower the ILI, the better the utility is managing water loss, with 1 generally being considered the lowest that is economically obtainable. As part of Waukesha's 2006 Water Master Plan, water loss was evaluated using this methodology, an ILI of 1.3 was determined for Waukesha.

Figure 1 is a reproduction from Lambert, A.O. and Dr. R. D. McKenzie, Practical Experience in using Infrastructure Leakage Index, International Water Association Conference 'Leakage Management: A Practical Approach', Lemesos, Cyprus, November 2002. The figure illustrates the ILI of seven North American systems compared to the International Water Association (IWA) International data set.

Table 4 is a reproduction from Water Audits and Loss Control Programs, AWWA M36, 2009 summarizing guidelines for the use of the ILI as a preliminary leakage target-setting tool.

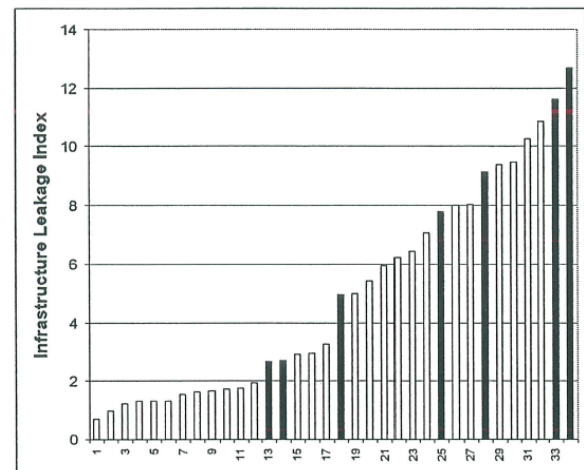


Figure 1. ILI Comparison

5.0 CONCLUSION

The Waukesha water Utility has divided the water distribution into eight pressure zones to ensure that pressure is maintained above regulatory requirements under current and projected water demand and operating conditions. Hydraulic modeling has confirmed that the current system pressure is adequate to ensure that the needed fire flows can be delivered. Historical water main breaks and leakage levels are below acceptable norms.

Table 4. Guidelines for Use of the Level Infrastructure Leakage Index as a Preliminary Leakage Target-Setting Tool (in lieu of having a determination of the system-specific economic level of leakage)

Target ILI Range	Water Resources Considerations	Operational Considerations	Financial Considerations
1.0 - 3.0	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.	Operating with system leakage above this level requires expansion of existing infrastructure and/or additional water resources to meet the demand.	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.
3.0 - 5.0	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term planning.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources can be developed or purchased at reasonable expense. Periodic water rate increases can be feasibility effected and are tolerated by the customer population.
5.0 - 8.0	Water resources are plentiful, reliable, and easily extracted.	Superior reliability, capacity, and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Cost to purchase or obtain/treat water is low, as are rates charged to customers.
Greater than 8.0	While operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0-other than as an incremental goal to a smaller long-term target-is discouraged.		
Less than 1.0	In theory, an ILI value less than 1.0 is not possible. If the calculated ILI is just under 1.0, excellent leakage control is indicated. If the water utility is consistently applying comprehensive leakage management controls, this ILI value validates the program's effectiveness. However, if strict leakage management controls are not in place, the low ILI value might be attributed to error in a portion of the water audit data, which is causing the real losses to be understated. If the calculated ILI value is less than 1.0 and only cursory leakage management controls are used, the low ILI value should be considered preliminary until it is validated by field measurements via the bottom-up approach.		
Source: Water Audits and Loss Control Programs, AWWA M36, 2009.			